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Aircraft Technician Series

GS-2185

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SERIES DEFINITION

This series includes all positions the primary duties of which are to perform, instruct, or supervise flight crew work, particularly (1) flight engineering work supporting the operation of heavy multiengine aircraft, (2) controlling and operating aerial refueling systems aboard tanker aircraft, and (3) loading, positioning, and securing cargo in transport aircraft.

This standard supersedes the evaluation material for flight engineer and aircraft loadmaster positions contained in the Aircraft Operation Series, GS-2181, issued in December 1967 (TS-71) and revised in May 1979 (TS-35).

SERIES COVERAGE

This series covers flight crew positions supporting the operation of aircraft. Primary coverage is of civilian technician positions in armed forces reserve organizations. In addition to being members of the reserves, these technicians hold full-time civilian positions in their particular units.

Positions covered by this series primarily perform the duties of their particular aircrew specialty in support of unit flying assignments. Also included in this series are positions responsible for providing ground and flight instruction for aircrew members, since the career relationships of such positions are in the aircraft operation field and they have as their primary qualification requirement experience and training in the particular aircrew specialty.

Flight engineers assist in preflight planning, including inspections and checks of the aircraft systems, and provide support to the pilot by monitoring the operation of engines and aircraft systems throughout the flight, controlling aircraft environmental systems, and performing related flight duties. These positions require knowledge of the operating principles and characteristics of aircraft electrical, mechanical, propulsion, and hydraulic systems, and skill to analyze performance, detect and diagnose malfunctions, and initiate corrective action.

Aerial refueling technicians are primarily involved in controlling and operating aerial refueling systems aboard tanker aircraft. They plan and direct the loading of the aircraft, compute weight and balance factors, direct receiver aircraft into position, control refueling operations, and take emergency action to avert hazardous situations. These positions require knowledge of in-flight refueling systems, the techniques and procedures for refueling a variety of aircraft under different conditions, and applicable emergency procedures.

Aircraft loadmasters are primarily responsible for planning and directing the loading, positioning, and securing of cargo in transport aircraft in accordance with aircraft weight and balance factors, nature of the cargo involved, flight itinerary, security considerations, and emergency jettison plans. They may also participate in planning and preparing the aircraft for aerial drop of cargo and personnel. These positions require knowledge of the capacity, configuration, and structural limitations of transport aircraft; the effect of weight and balance factors on aircraft performance; cargo restraint techniques; and emergency procedures related to cargo missions.

Other aircrew positions not specifically described above may be classified in this series when no other series is more appropriate.

EXCLUSIONS

1. Positions which primarily require application of the knowledge and skills to pilot fixed or rotary wing aircraft, or to perform related staff work, are classified in the [Aircraft Operation Series, GS-2181](#).
2. Positions which primarily require application of the knowledge and skills related to the navigation of aircraft or operation of weapons systems are classified in the [Air Navigation Series, GS-2183](#).
3. Positions which require primarily a professional knowledge of education and training, or a practical knowledge of the principles and techniques of education and training in combination with a knowledge of the subject, occupation, or field in which education, instruction, and training are given, are classified in an appropriate series in the [Education Group, GS-1700](#) when they have their career relationships in the education and training field.
4. Positions which primarily involve the maintenance or repair of aircraft or components (e.g., the engine, navigation, electrical, or hydraulic systems), and which have as their paramount requirement the application of knowledge and skills gained through trade or craft experience, are graded under the [Federal Wage System](#).
5. Positions which primarily involve servicing, loading, or weighing of aircraft, or other duties not requiring a knowledge of the aircrew specialty duties and responsibilities, and which have as their paramount qualification requirement the knowledge and skills gained through trade, craft, or laboring experience, are graded under the [Federal Wage System](#).
6. Crew positions on cargo helicopters which are responsible for such tasks as loading and securing cargo, monitoring equipment during flight, operating hoists or ramps, securing and releasing external cargo loads, and providing directions for maneuvering the helicopter, and which do not assist the pilot in the operation of the helicopter, are graded under the [Federal Wage System](#).

NOTES TO USERS

Organization of the Standard

Part I of this standard provides criteria for evaluating positions primarily involved in the performance of flight crew duties for the specialties covered by this series. The grading criteria are geared directly to the evaluation of full performance level positions, i.e., those positions involving performance, under general supervision, of the full scope of the duties of their particular crew specialty. Where necessary, grade levels for trainee positions may be derived by considering the progress of the individuals involved in relation to meeting full performance level requirements.

Part II provides guidance for evaluating instructor positions in this series. These positions provide ground and flight instruction and/or evaluate programs of instruction for their particular aircrew specialty.

Supervisory Positions

This standard provides grade level criteria for nonsupervisory positions only. For supervisory positions, use the [Supervisory Grade-Evaluation Guide](#).

TITLES

Authorized titles for positions covered under Part I of this standard are:

Flight Engineer

Aerial Refueling Technician

Aircraft Loadmaster

Positions which are also covered under Part II are identified with the parenthetical suffix of (*Instructor*).

Other specialized positions in the Air Reserve Technician program appropriately classified to this series may have other titles as indicated in FPM Supplement (Internal) 930-71, *Recruitment of Air Reserve Technicians Through Competitive Examination*.

Positions which meet the criteria for titling in the [Supervisory Grade-Evaluation Guide](#) are prefixed as *Supervisory*.

PART I -- AIRCREW POSITIONS

OCCUPATIONAL INFORMATION

Positions in this series serve as members of the flight crew for heavy multiengine aircraft. Missions and assignments of the aircraft involved include airlift of equipment and personnel, tactical airdrop of supplies and troops, medical evacuation flights, search and rescue operations, gunship weapons training and surveillance, and aerial refueling missions. Operation of the aircraft to accomplish these missions requires a coordinated crew effort directed by the aircraft commander. Each of the crew positions has assigned duties and responsibilities before and during flight, the performance of which have a direct bearing on the success of the mission.

The makeup of the flight crew and the scope of duties and responsibilities assigned to individual crew positions are governed by the aircraft flight manual and regulations covering the conduct of the particular mission or assignment. To illustrate, on tanker aircraft where cargo is also being transported, the aerial refueling technician performs certain tasks that would otherwise be performed by a loadmaster. Similarly, the nature and scope of tasks performed by loadmasters vary, depending on whether the mission involves point-to-point transportation of personnel, coordination of a large loading crew, or the tactical airdrop of supplies or personnel.

The following sections discuss the primary crew duties and responsibilities and the knowledge and skills required to perform the work of positions in this series.

Flight Engineer

Major tasks and responsibilities of flight engineers include:

- Determining aircraft takeoff, in-flight, and landing data based on such factors as weather, field conditions, configuration, and weight of the aircraft;
- Computing fuel load when required;
- Performing visual inspection of the condition of the aircraft in terms of its readiness for flight, including a check of maintenance status information;
- Monitoring fuel, cargo, and ammunition loading;
- Computing and/or reviewing weight and balance factors;
- Performing operational check of aircraft systems, setting flight controls, and advising maintenance personnel of any irregularities;
- Assisting pilot with engine start and monitoring runup, and advising on engine performance, optimum speeds, and time and distance estimates;

- Monitoring the operation of engines and other aircraft systems, e.g., fuel, hydraulic, and electrical systems;
- Operating built-in test and trouble shooting systems;
- Operating aircraft environmental systems such as pressurization, heating, and deicing;
- Operating weapons control panels on gunships, selecting rates of fire, adjusting gunsights, and arming weapons;
- Observing warning indicators for system malfunctions, assessing the impact of malfunction, and initiating alternate procedures or emergency actions;
- Checking the readiness of special equipment, e.g., coolant levels on cryogenic infrared devices;
- Managing fuel flow to maintain aircraft trim, reduce stress on the aircraft, and conserve fuel;
- Updating and recording in-flight performance data;
- Maintaining records covering flights, repairs, maintenance, and inspections;
- Assisting the pilot in the operation of navigational equipment, when required;
- Computing landing data based on fuel consumed and conditions in the landing area; and
- Performing preflight, cross-country intermediate, and postflight inspections and coordinating with maintenance personnel on aircraft discrepancies with potential impact on safety.

Flight engineer positions require the following knowledge and skills:

- Knowledge of the operating principles and characteristics of major aircraft systems (e.g., engine, fuel, electrical, hydraulics, fire suppression, environmental, pressurization) and the function of applicable controls, panels, and indicators, and skill to monitor/analyze operating conditions, diagnose problems, determine alternate procedures, and/or initiate corrective action;
- Knowledge of the interrelationships among the aircraft systems and the impact of change in performance in one on others, and skill to analyze overall aircraft condition in terms of flight safety;

- Knowledge of factors affecting aircraft performance (e.g., the effects of temperature, humidity, and altitude on engine systems), and skill to determine takeoff and emergency landing data and monitor in-flight performance;
- Knowledge of aircraft performance parameters and limitations in relation to flight procedures during takeoff, climb, cruise, descent, and landing, and skill to take and interpret instrument readings, make control adjustments, manage fuel flow, and update performance data;
- General knowledge of navigational procedures, and skill to operate navigational equipment and monitor its functions;
- Knowledge of aircraft maintenance procedures, and skill in diagnosing problems and accurately reporting detailed symptoms and conditions; and
- Knowledge of controls and procedures for in-flight refueling, for certain aircraft.

Aerial Refueling Technician

Major tasks for aerial refueling technicians assigned to tanker aircraft include:

- Determining takeoff and emergency landing data based on weather, field conditions, configuration, and loading of the aircraft;
- Computing and applying weight and balance factors;
- When required, preparing cargo loading plans, directing loading operations, and inspecting for proper weight distribution and use of restraints;
- Performing preflight check of various systems (e.g., oxygen, communications, life support), including interior inspection of aircraft and preflight check of navigational sextant;
- Briefing passengers on mission requirements, including use of life support equipment and emergency procedures;
- Operating the auxiliary power unit;
- Performing preflight inspection and in-flight operational check of air refueling equipment;
- Assisting the navigator by making celestial observations;
- Directing receiver aircraft into air refueling positions;
- Operating in-flight controls to effect contact between the tanker and receiver aircraft;

- Monitoring refueling control panel and advising pilot of receiver aircraft of actions required to safely maintain position;
- Keeping tanker pilot advised on the progress of air refueling operations;
- Performing emergency procedures and operations for off-loading fuel; and
- Accomplishing postflight checks.

For aerial refueling technician positions, primary knowledge and skill requirements include:

- Knowledge of function and operating characteristics of electrical, hydraulic, and pneumatic equipment associated with the in-flight refueling system, and skill to detect malfunctions and apply corrective action, including use of emergency procedures;
- Knowledge of cargo capacity and limitations, including floor load restrictions, shoring and restraint requirements, and use of load charts and graphs, and skill to apply weight and balance formulae in preparing loading plans which will provide the optimum center of gravity throughout the flight;
- Knowledge of procedures for preparing cargo for loading, and skill to direct loading operations and inspect load for proper weight distribution, compatibility of cargo, and use of appropriate restraints;
- Knowledge of procedures for the in-flight refueling of a variety of aircraft (jet fighters, bombers, transports) under varied conditions and applicable cautions and emergency procedures, and skill to direct receiver aircraft into refueling position (between 2 and 5 meters (6 and 18 feet)) and operate in-flight boom, probe, and/or drogue controls and switches to safely effect and maintain contact between tanker and receiver during fuel transfer;
- Knowledge to recognize situations necessitating a "break away" order to both receiver and tanker pilots;
- Knowledge of system indicator panels, and skill to monitor engine instruments, fuel gauges, and circuit breaker panels during flight;
- Knowledge of the use of the sextant, and skill to perform preflight inspection and take celestial observations as required;
- Knowledge of applicable emergency procedures and evacuation routes, and skill to demonstrate use of survival equipment and brief passengers as required;

- In the absence of a flight engineer, knowledge of aircraft systems sufficient to perform preflight checks or operate equipment, such as the auxiliary power unit; and
- Knowledge of customs and agricultural regulations sufficient to serve as aircraft representative for border clearances.

Aircraft Loadmaster

Major tasks for loadmasters assigned to personnel and cargo airlift and aerial delivery missions include:

- Developing the cargo loading plan, considering the quantity, weight and configuration of the load; floor capacity; emergency jettison requirements; and proper location in the cargo compartment to achieve optimum center of gravity throughout the flight;
- Preflight check and inspection of equipment and systems related to the mission involved, e.g., cargo or personnel transport;
- Inspecting cargo compartments, systems, and auxiliary equipment needed to support the mission, including crew and passenger required equipment, e.g., galleys, comfort pallets, litters, or seats;
- Supervising loading of cargo, insuring that proper restraint is provided to prevent shifting in flight, and completing weight and balance planning documents;
- Performing preloading inspection of cargo and containers for airdrop in aerial delivery missions, attaching extraction parachutes, suspension systems, and static lines;
- Briefing passengers on the flight, explaining emergency procedures, and providing for their needs;
- Preparing the aircraft for personnel airdrop, monitoring chutists exiting the aircraft and recovering static lines;
- Accomplishing emergency release or jettisoning of cargo when required;
- Directing the off-loading of cargo;
- Serving as the pilot's representative in dealing with customs and agricultural officials; and
- For search and rescue missions, briefing spotters on search techniques, releasing parabundles, checking pararescue chutists' equipment, and dropping survival gear.

For aircraft loadmaster positions, the primary knowledge and skills include:

- Knowledge of systems and equipment associated with the cargo function, including operation of doors, loading ramps, cargo winches, and restraint rail systems, and skill to apply this knowledge to plan and complete loading operations;
- Knowledge of aircraft capacity and limitations, including floor load restrictions, shoring and restraint requirements, and use of load charts and graphs, and skill to apply weight and balance factors in preparing loading plans which will provide the optimum center of gravity throughout the flight;
- Knowledge of other assigned passenger/cargo compartment systems, such as oxygen, lighting, interphone, auxiliary power unit, and crew or passenger required items (comfort pallets, seats, etc.), and skill to perform preflight checks and inspections;
- Knowledge of procedures for preparing cargo for loading, including procedures for palletized cargo, vehicle preparation, handling and placement of hazardous cargo, and skill to direct crews in loading according to weight and balance factors, cargo destination, and emergency jettison plans;
- For aerial delivery missions, knowledge of procedures for preparing containers and pallets for airdrop and configuring for personnel airdrops, and skill in rigging extraction systems;
- Knowledge of applicable emergency procedures and evacuation routes, and skill to demonstrate use of survival equipment and brief passengers; and
- Knowledge of customs and agricultural regulations as required for border clearance.

ANALYSIS OF CLASSIFICATION FACTORS

The following sections discuss the factors used to classify the work of positions in this series.

Knowledge and Skills

This factor considers the nature and extent of knowledge and skills required in performance of the work. Positions in this series vary with respect to requirements for knowledge of aircraft systems and equipment directly related to performance of crew duties and skills to interact with these systems or equipment to accomplish assigned missions. All crew positions are required to know the operating principles and characteristics of the systems/equipment involved with their particular assignments, their relationship to aircraft performance, probable causes of malfunctions and required corrective action, and emergency procedures, and to possess the skills to integrate operations with the other crew positions.

At lower grade levels, knowledge may relate primarily to those specific systems and equipment in the aircraft necessary for accomplishing straightforward cargo or passenger airlift missions. Typically, the systems/equipment involved are limited in number, are less complex than those

characteristic of higher grades, or do not involve primary aircraft systems e.g., propulsion. The skills required to carry out crew responsibilities are more restricted due to the limited range of functions assigned to the positions.

At higher grades, the knowledge requirements are more extensive in that they pertain to a broader range of equipment and systems, or involve systems having more complex features e.g., primary systems critical to the operation of the aircraft or the completion of specialized missions. Procedures for performing the work are more extensive and require a higher degree of analytical skill in understanding relationships among the systems, assessing the impact of malfunctioning systems, and identifying appropriate corrective action.

Responsibility

This factor considers the nature and variety of assigned duties and responsibilities and the relative difficulty involved in their performance. Operation of the aircraft to perform assigned missions requires a coordinated effort on the part of the crew. Each crew position has a clearly defined role and each crew member must understand the extent of their individual responsibilities and their relationship to the other crew positions. Certain responsibilities are common to all crew positions, e.g., monitoring radio transmission, participating in crew briefings, reporting emergency or unsafe conditions, briefing passengers on emergency procedures, performing personal equipment inspections, or advising maintenance personnel in identifying malfunctions. In terms of their primary crew responsibilities, however, these positions vary both in terms of the nature and variety of assigned duties and in the level of difficulty involved in the work.

At lower grade levels, duties are limited to one or a narrow range of aircraft functions necessary to accomplish a particular mission. For example, the responsibilities may encompass weight and balance and load planning functions related to cargo airlift missions. Positions at higher grades typically have responsibility for a significantly broader range of aircraft systems or functions, with responsibilities relating to monitoring, operation, and control of primary aircraft systems. Other positions have responsibility for a wider variety of aircraft functions which encompass elements of the work of other crew positions (e.g., combined loadmaster and in-flight refueling responsibilities) or involve the intensive direction and coordination of assignments required to load and secure large cargos.

The level of difficulty associated with the work is influenced by the nature and variety of duties comprising the crew assignment. At lower grades, where a relatively narrow range of aircraft capabilities and functions is involved, problems are more readily identified and require consideration of fewer alternatives in terms of decision making. Typically, decisions may be based on analysis of easily discernible facts (e.g., the operational status of a particular piece of equipment) and have little impact beyond the assigned aircraft function(s), even though they may impact on the overall mission of the aircraft.

Positions at higher grades, which have responsibility for a wide variety of the more complex aircraft systems or functions, apply a higher degree of analytical skill and judgment to determine whether the systems are functioning properly, identify probable causes, assess the impact of malfunctions on flight safety or the potential for damage if the system or component continues to operate, and employ alternative or emergency procedures. To a greater degree, problem identification is complicated by the possibility of multiple causes or misleading indicators, and decisions on the appropriate course of action involve a number of alternatives.

Hazard

A certain degree of risk is associated with all types of flying due to the possibility, however remote, of some critical failure in the aircraft or the incidence of human error. This aspect applies both to military and civilian aviation, e.g., the degree of risk involved in transporting passengers from one point to another is equivalent whether the flight is made by military transport or commercial air carrier. Military and civilian aviation organizations are diligent in striving to reduce the element of risk through extensive training and evaluation of crew members, comprehensive flight safety programs, rigorous proficiency examinations, and the use of standardized procedures for accomplishing assignments.

However, some military flying assignments, involving positions in this series, entail flight operations and procedures that introduce a higher degree of hazard. For example, flying tanker aircraft in very close proximity to other aircraft while transferring fuel introduces an element of hazard not found in flights to transport cargo. Similarly, airdropping cargo involves an element not typically found in passenger operations.

For these reasons, the element of hazard has been fully considered in the development of the grading criteria in this standard. Hazard is treated in the grade level illustrations in terms of its impact on the total job, in those situations where the degree of hazard exceeds the minimum level and is therefore a significant factor.

Influence on the Aircraft Involved

The aircraft involved in these assignments has the most impact in terms of the broad missions of the aircraft (e.g., aerial refueling) and to a lesser extent in the size or complexity of the aircraft. This is because mission requirements control the duties and responsibilities of individual crew positions and thus have the most significant impact on the knowledge and skills applied in the work. The aircraft involved may differ in size, configuration, power, or other characteristics, but such differences have a lesser grade influencing impact.

To illustrate, weight and balance factors and the knowledge and skills necessary for loading, positioning, and securing cargo are essentially the same regardless of the size of the aircraft. However, some transport missions handled by the largest cargo aircraft may require significantly more difficult duties in planning, organizing, and coordinating the loading and securing of unpalleted cargos. Although the various models of aerial tankers contain different configurations

for aerial refueling, significant differences in the major duties and responsibilities of aerial refueling technician from one model tanker to another are minimal. However, if the refueling mission required a technician to refuel continually a number of receiver aircraft over an extended overseas flight, the difficulty would be greater than for refueling a few aircraft over a typical refueling track.

Larger aircraft typically have more installed aircraft systems (e.g., hydraulics) than the smaller aircraft. However, the basic elements and operating principles of the systems are the same and require of the flight engineer essentially the same level of knowledge and skills. The presence or absence of a particular task for the flight engineer position, due to a different model of aircraft, does not have significant grade impact, when considered in the context of the total duties and responsibilities of that position. However, some mission requirements and aircraft configurations can combine to require a level of difficulty and responsibility above that normally required of a flight engineer.

For these reasons, it is not feasible to attempt to quantify specific systems, or to describe differences among aircraft systems, for use as grade level benchmarks, and no specific models of aircraft are identified in the grade evaluation material.

Other Classification Factors

The significance of other classification factors considered in the development of the grading criteria is discussed in the following paragraphs.

Supervision Received: A high degree of independence from supervision is credited in the grade level material as being characteristic of full performance level positions. Within the context of the crew concept, safe and effective accomplishment of assignments require that individuals perform their duties with minimal supervisory direction and assistance.

Guidelines: Guidelines used in the work include aircrew training manuals, the aircraft flight manual, checklists, operational manuals and bulletins, and agency training regulations. The thrust of these guidelines is to establish standardized procedures for performing individual tasks and functions and coordinating with other crew members.

The existence of specific guidelines for accomplishing the work does not alter the fact the crew positions vary in terms of their knowledge and skills requirements, i.e., the number and diversity of guidelines and procedures that must be mastered. This aspect of the work is treated under the knowledge and skills factor.

Nature and Purpose of Contacts: Positions in this series have a similar range of personal contacts in that they primarily involve other members of the unit or individuals at the same or higher organizational levels in the agency. Typical contacts are made in their capacity as members of the flight crew or in performance of other related duties.

Physical Demands: Individuals must meet certain physical requirements to serve as a member of the flight crew. Demands of the work in terms of general physical abilities (e.g., agility and dexterity) vary only to a slight degree. The frequency and intensity of physical exertion (e.g., lifting, pushing, crouching) varies to a slightly greater degree, depending upon requirements of the assignment.

GRADING POSITIONS

The following grade level material discusses the work of positions in terms of typical duties, knowledge and skills required, responsibility, and hazards involved in the work. This material provides a conceptual framework for differentiating among grades for these positions. Individual crew positions for a particular aircraft or for a specific mission are not described. (See also the discussion of duties, responsibilities, and knowledge and skills required in the earlier Occupational Information section.)

Some aircrew positions may have duties and responsibilities that clearly exceed those described below, due to a need for knowledge of special equipment, system, or controls; intensive direction or coordination of critical in-flight activities or loading assignments; or the performance of a wide variety of preflight and in-flight duties on complex aircraft being used for difficult and specialized missions. In such cases, the position should be classified to the appropriate grade by extending the criteria in this standard and applying sound classification principles.

AIRCRAFT LOADMASTER, GS-2185-07

This level includes aircraft loadmaster positions assigned to the crew of heavy multiengine transport aircraft. Typical missions for these aircraft include airlift of cargo and personnel, search and rescue, medical evaluation, and airdrop of personnel and equipment. Aircraft loadmasters are responsible to the aircraft commander for performance of weight and balance computations, cargo load planning and security, directing cargo or personnel loading and off-loading operations, providing for passenger needs and safety, and assisting in cargo or personnel airdrops.

Duties

Preflight duties include planning and computing the distribution of cargo and/or personnel throughout the compartments and stations of the aircraft to achieve an optimum weight and balance condition for the safe and efficient operation of the aircraft. Computations take into consideration total weight involved (aircraft, fuel, cargo, and crew), duration of the flight, weight lost through fuel consumption, and conditions at takeoff, mid-flight, and landing. In load planning, the loadmaster also considers allowable floor weights, need for shoring and restraint, segregation of hazardous cargo, and plans for emergency jettison of cargo. The loadmaster uses prescribed mathematical formulae and/or charts by which the computations of weight for each station in the cargo compartment will be accomplished to accommodate the entire load.

Performs preflight check of the equipment/systems associated with the cargo function, including restraint rails, cargo doors, ramps, hatches, and other assigned equipment in the cargo compartment, e.g., lighting and communications. On personnel airlift missions, briefs passengers on emergency procedures and use of survival equipment. Directs loading of the aircraft according to plan and ensures that cargo is adequately restrained. For airdrop missions, performs preload inspection of airdrop cargo, and ensures that pallet and container extraction systems are rigged properly and that equipment for personnel drops are functional.

In-flight duties include tending to the needs of passengers, checking security of the cargo, operating cargo doors and hatches, completing predrop check of cargo/personnel, releasing airdrop cargo, and, if necessary, taking emergency action to jettison cargo.

Other duties include recomputing weight and balance for landing, representing the aircraft commander in dealing with customs authorities, directing off-loading operations, and performing postflight checks and inspections.

Knowledge and skills required: Systems or equipment knowledge and skills requirements relate primarily to the cargo/passenger transport function, or to equipment located in or serving the cargo/passenger compartment, e.g., mechanical restraint systems, cargo doors, ramps, hatches, seats, litters, lighting, and intercom systems. Specific knowledge and skills applied vary depending upon the assignment, i.e., point-to-point transportation of cargo and/or personnel or airdrop missions.

Responsibility: Procedures related to cargo loading (pallets, containers), use of restraint rails, and parachute extraction rigging are highly standardized. For outsize cargo, guidelines typically apply; however, the loadmaster must recognize deviations from standard procedures and apply judgment to determine positioning, bracing, and securing of the items.

Decisions relate mainly to computations of weight and balance and restraint factors, and involve use of basic arithmetic functions and skills to interpret loading charts and schematics.

Hazards involved: The degree of hazard involved varies according to the nature of the assignments. Those involving the transport of cargo and/or personnel from one location to another typically entail only a minimum degree of hazard. Assignments involving the airdrop of cargo or personnel entail a substantially higher degree of hazard associated with working around open doors of the aircraft, taking emergency action to release cargo that is lodged in the aircraft, or recovering parachute static lines.

AERIAL REFUELING TECHNICIAN, GS-2185-08

This level includes aerial refueling technician positions assigned to tanker aircraft. Tanker aircraft are primarily responsible for the in-flight refueling of other aircraft, with a secondary role of transporting cargo or personnel. In addition to their primary responsibility for controlling and operating the in-flight refueling system, these positions (as required) perform aircraft loadmaster

functions and provide assistance to the navigator and pilot in the operation of the aircraft.

Duties

Preflight planning duties include determining fuel, personnel, and cargo weight and distribution for computing aircraft weight and balance. Ensures that the loading, tiedown, and proper weight distribution is accomplished as preplanned to maintain optimum center of gravity for safe and efficient operation. Performs preflight check and inspection of the in-flight refueling system and controls, and preflight checks of other assigned systems and equipment (e.g., electrical system, intercom, hatches). As required, directs cargo loading and securing operations, and briefs passengers on emergency procedures and use of survival equipment.

For tanker aircraft which do not require a flight engineer, the aerial refueling technician computes takeoff and landing data, assists pilot in completing preflight checklist, and monitors engine instruments during flight. Maintains in-flight weight and balance status of the aircraft and recomputes status prior to landing. Assists the navigator by performing preflight checks of navigation equipment and making celestial observations.

Prior to rendezvous with receiver aircraft, the technician performs an operational check of refueling systems and controls. Communicates with receiver pilots, directs them into air refueling position, and operates the in-flight refueling boom to make contact with the receiver aircraft. Monitors controls for proper operation of refueling systems, and advises receiver pilot of actions required to safely maintain position within the air refueling envelope. Controls operation of refueling by maintaining communications with the tanker pilot and pilot of the receiver aircraft. The technician must be prepared to react immediately to discontinue refueling operations and to perform emergency operations and procedures to off-load or on-load fuel.

Postflight duties include supervising cargo or passenger offloading, performing post-flight check and inspection of the aircraft and in-flight refueling system, and completing required flight reports.

Knowledge and skills required: The work requires a thorough knowledge of aircraft electrical, hydraulic, and pneumatic systems applicable to the in-flight refueling operation. The work also requires knowledge of weight and balance factors, and the procedures and operations required for cargo transport; a general knowledge of aircraft fuel, electrical, and hydraulic systems and components; and a basic knowledge of aircraft navigational equipment and operating procedures. Aerial refueling technicians must have the skill to monitor and operate a variety of aircraft systems and equipment involved in the work and carry out the procedures and operations necessary to complete their assigned responsibilities.

Responsibility: The work entails performance of a broader range of diversified functions, both preflight and inflight. In addition to primary responsibility for the in-flight refueling operation, the work may involve functions normally performed by loadmasters for cargo/ personnel airlift missions. The work also entails the assisting the navigator and the pilot by performing some of

the more basic tasks that would normally be performed by a flight engineer (e.g., making celestial observations, computing takeoff and landing data).

In the performance of their primary duties, these positions have considerable responsibility for making safe contact with receiver aircraft, insuring that receivers remain safely within the refueling envelope throughout the transfer, and taking appropriate emergency action.

Hazard involved: Aerial refueling operations are characterized by a substantial degree of hazard. The work includes both day and night operations in all weather conditions and involves a variety of receiver aircraft, some of which may affect the flight performance of the tanker. Performance of the work requires considerable skill to insure safe contact with receivers throughout the fuel transfer and to react to abnormal changes in attitude of the receiving aircraft.

FLIGHT ENGINEER, GS-2185-09

This level includes flight engineer positions assigned to the flightcrew of heavy multiengine aircraft. Aircraft missions include cargo/personnel airlift or airdrop, search and rescue, medical evacuation, and certain in-flight refueling missions. Flight engineers are primarily responsible for participating in flight planning, performing preflight checks of the aircraft, assisting the pilot in ground and flight operations, monitoring the operation of engines and all aircraft systems throughout the flight, and controlling aircraft environmental systems.

The primary responsibility of the flight engineer is assisting the pilot in the safe and efficient operation of the aircraft. By way of contrast, primary responsibilities of other aircrew positions normally involve specific functions or operations related to the overall mission of the aircraft.

Duties

Flight engineer preflight duties include flight plan coordination; checking with maintenance personnel on aircraft status; determining or reviewing weight and balance computations; computing aircraft performance data for takeoff, cruise, and landing; determining fuel consumption; checking overall condition of the aircraft; and performing aircraft systems operational checks. The flight engineer inspects engines, fuselage, and control surfaces for mechanical and structural soundness and proper operation. Assists the pilot in completing preflight checklist, during engine start and throughout ground operations. Monitors adherence to departure procedures, routing, altitudes, and clearances.

During flight, the engineer continually monitors the operation of engines and all aircraft systems such as electrical, hydraulic, fuel, air conditioning, and pressurization. Manages fuel distribution and consumption and records actual in-flight performance. Observes warning indicators and lights for fire, overheat, depressurization, or system failures. Reports abnormal conditions or malfunctions to the aircraft commander, advises on false indicators, and, as required, initiates corrective or emergency action. Performs in-flight adjustments that are required and possible. May perform limited navigational assistance to the pilot by monitoring adherence to the flight

plan, assisting in the operation of navigational equipment, and operating weather avoidance radar. Updates landing data based on current conditions at the destination.

Completes postflight check of the aircraft and coordinates with maintenance activities on discrepancies requiring correction.

Knowledge and skills required: Knowledge and skills requirements are concerned with primary systems critical to performance of the aircraft and involve the complete range of flight operations and procedures. Required knowledge and skills are related to overall performance of the aircraft and require a depth of theoretical and operational knowledge of a wide variety of aircraft systems and components, e.g., propulsion, airframe, electrical, hydraulic, and environmental systems. Most other aircrew positions require knowledge and skills related to a narrower range of systems and equipment to perform more limited functions.

Responsibility: Degree of responsibility is greater than is characteristic of most other aircrew positions due to the flight engineer's responsibility for directly assisting the pilot in the operation of the aircraft, the complexity of the systems involved, and the skill required to diagnose and analyze the impact of malfunctions on safe operation of the aircraft.

Demands for the exercise of judgment in more critical areas are greater because of such factors as:

- Interrelationship of the aircraft systems involved, i.e., the need to consider impact of malfunctions on overall performance and effect on other systems;
- Greater variety of possible causes of malfunctions; and
- Alternatives that must be considered in taking corrective action.

Hazard involved: As is the case with other crew positions, the degree of hazard involved is directly related to the requirements of the mission. For example, flight engineers assigned to aircraft engaged in tactical airdrops or operations from short, unimproved airfields would be exposed to a greater degree of hazard than those assigned to aircraft engaged in point-to-point transportation of cargo or personnel.

PART II -- INSTRUCTOR POSITIONS

OCCUPATIONAL INFORMATION

This part provides criteria for evaluating positions primarily involved in instructing and/or flight examining for their particular aircrew specialty or specific mission requirements. Duties and responsibilities may include providing ground and flight training to develop and upgrade the skills of aircrew members, administering flight evaluations of aircrew members and instructors, and evaluating the effectiveness of the aircrew training program. Such positions have as their

paramount requirements, knowledge of the full range of crew duties and responsibilities for their particular specialty; knowledge of methods of instruction; knowledge of aircrew training program requirements, procedures, and standards of performance; and skill to apply this knowledge in planning, developing, and executing unit training and evaluation programs.

Reserve training programs at the individual unit level are geared to provide specialized training and experience to develop full competence in the performance of crew duties for the assigned unit missions. Reservists without prior experience or training in the target aircrew specialty receive basic training in active duty military schools, including specific training for the assigned aircraft and missions. Though schooled in the basics, these reservists require further training and experience to master full performance level skills in their specialty.

Reservists with prior training and experience in their specialty may receive refresher training at the unit level to fully qualify them for the aircrew duties. For example, a reservist with prior loadmaster experience may receive qualification training at the unit level, without retaking the basic training course.

Instruction Assignments

Regardless of the particular aircrew specialty involved, instructors in these series follow prescribed programs of instruction in terms of course content, coverage, and scope of material presented. The instructor may prepare course outlines or adapt lesson material to meet the training needs of particular situations or students and/or supplement existing training materials with approved texts. Usually, the overall program of instruction is standardized according to the kind of flying assignments or missions of the unit. In rare cases, course material may need to be specifically developed.

Instructors are selected from among the best qualified aircrew members. Prior to designation as an instructor, they are required to take formal training in the methods of instruction, complete on-the-job training which includes practice instruction, and pass a flight evaluation.

Typical instruction duties include:

- Reviewing prior training and experience records of newly assigned reservists to determine and plan the type and level of training necessary to achieve the required level of proficiency or skill;
- Preparing individual development records, along with a training syllabus with projected units of training required;
- Planning and conducting ground training, including simulator and procedures training in operational/mission requirements, equipment operation, correct method for performing aircrew duties, and applicable emergency procedures;

- Scheduling and participating in flights with reservists to observe in-flight performance, demonstrate proper procedures and techniques, and evaluate progress;
- Recommending military reclassification actions for reservists;
- Maintaining records of ground and flight training provided to reservists, analyzing progress, and preparing required training reports; and
- Performing various other administrative functions concerned with the unit training program, such as scheduling reservists for training periods; interviewing potential candidates for crew positions; acquiring training aids, course materials, and training equipment; and insuring that technical orders/publications are properly maintained and pertinent changes are brought to the attention of the reservists.

Flight Examining Assignments

Flight examiners are fully qualified instructors who are authorized to administer flight evaluations for their particular aircrew specialty. Typical flight examining duties include:

- Evaluating the performance of aircrew members completing initial training;
- Instructing, evaluating, and examining rated instructors;
- Providing periodic flight evaluations of rated aircrew members; and
- Administering requalification evaluations.

Some flight examiners are designated as standardization/evaluation flight examiners and have additional responsibilities which include:

- Insuring that established standards of flight proficiency are maintained through evaluation or observation;
- Evaluating performance during operational and training flights on a no-notice basis;
- Analyzing evaluation data for adverse trends in performance;
- Evaluating ground and flight training programs;
- Reviewing aircraft incidents, operational hazards, and accident reports and making appropriate recommendations to supervisors;
- Recommending improvements in aircrew procedures; and

- Attending critiques of flight evaluations.

GRADING POSITIONS

Instructor positions subject to this part are classified in accordance with the following criteria.

1. The position being evaluated must require application of the complete range of full performance level knowledge and skills necessary for the particular aircrew job or specialty. Trainee or developmental positions, by definition, are excluded and should be evaluated using the criteria in Part I of this standard.
2. Positions graded under this part have as their primary responsibility performance of the work assignments described in the preceding section for instructing and/or flight examining. Where such positions are responsible for support of unit flying assignments, they will have as a secondary responsibility the performance of duties in their particular aircrew specialties. Crew positions responsible for conducting informal training on an occasional basis (e.g., providing demonstration of proper work techniques and procedures), or for performance of other duties not directly related to the flight training program, should be evaluated under Part I of this standard.
3. Nonsupervisory instructor positions are classified one grade above the grade of the full performance level aircrew job for which instruction is provided. For example, where the full performance grade of the aircrew position being instructed is GS-8, performance of instructor duties would result in grade GS-9. Performance of flight examining functions, including designation as a standardization/evaluation flight examiner, will not raise the level of the position more than one grade above the full performance grade level for that particular aircrew specialty.